CLAIMS

1. A device for the damped elastic connection of two parts, the device comprising at least one set of at least two tubular cylindrical sleeves of viscoelastic material fitted one inside the other substantially coaxially with the interposition of a rigid cylindrical and substantially coaxial ring between two contiguous viscoelastic sleeves of said set so that, for each pair of two contiguous sleeves, one of the two sleeves is an internal sleeve secured, by an internal cylindrical lateral face, to an external cylindrical lateral face facing it belonging to an internal rigid ring and, by an external cylindrical lateral face of said internal sleeve to an internal cylindrical lateral face facing it belonging to an intermediate rigid ring separating said internal sleeve from the other sleeve of said pair of sleeves, which is an external sleeve secured, by an internal cylindrical lateral face, to an external cylindrical lateral face of said intermediate ring and, by an external cylindrical lateral face of said internal sleeve, to an internal cylindrical lateral face of an external rigid ring, an innermost ring and an outermost ring of said set being secured, respectively, to an internal armature and to an external armature, each of which is connected to a respective one of two members for connection to said parts,

wherein, for each pair of two contiguous sleeves of said set, the internal sleeve and the external sleeve are made of a viscoelastic material which has a shear modulus g1 and g2 respectively, and have an axial length L1 and L2 respectively, an inside radius R1 and R2 respectively and a thickness e1 and e2 respectively, giving them a geometry such that the following formula is substantially satisfied:

$$g1 \cdot \frac{L1}{\ln(1+\frac{e1}{R1})} = g2 \cdot \frac{L2}{\ln(1+\frac{e2}{R2})}$$

2. A device according to Claim 1, wherein each of two annular axial end faces of each viscoelastic sleeve is shaped as a meniscus delimited by a curved free surface with a concave side facing axially outwards, and said axial length of each sleeve is measured between bottoms of the meniscuses of said two annular end faces of said sleeve.

3. A device according to Claim 1, wherein the viscoelastic material of the sleeves is an elastomer.

4. A device according to Claim 3, wherein the elastomer of the sleeves is a silicone elastomer with a high loss angle value as high as about 45°.

5. A device according to Claim 1, wherein each viscoelastic sleeve is moulded and preloaded in compression between the two rigid rings to which said sleeve is secured by its internal and external cylindrical lateral faces.

6. A device according to Claim 5, wherein for at least one pair of contiguous sleeves, the external sleeve is preloaded by shrink-fitting the corresponding external rigid ring.

7. A device according to Claim 6, wherein said shrink-fitting of the external rigid ring is brought about by plastic deformation of said external rigid ring radially inwards.

8. A device according to Claim 5, wherein for at least one pair of contiguous sleeves, the internal sleeve is preloaded by radial expansion of the corresponding internal rigid ring.

9. A device according to Claim 8, wherein said radial expansion of said internal rigid ring outwards is brought about by plastic deformation of the internal rigid ring.

10. A device according to Claim 1, wherein said set of at least two viscoelastic sleeves is shrink-fitted, into said external armature, arranged as an outer sheath, and/or around said internal armature, of cylindrical shape.

11. A device according to Claim 1, wherein the outermost ring of said set has, at an axial end facing towards the connecting member to which said outermost ring is connected, a radially thicker part to which the external armature is removably connected by fixing means.

12. A device according to Claim 11, wherein the outermost ring of said set is shrunk-on by cold rolling of its part extending in line with the outermost sleeve of said set.

13. A device according to Claim 1, wherein at least one of the innermost and outermost rings of said set is incorporated into the internal armature or external armature, respectively.

14. A device according to Claim 1, wherein said two connecting members are threaded ball ends with screw threads of opposite hand, or of the same hand but different pitch, each of said threaded ends being screwed into a tapped bore of one of the external and internal armatures, respectively, so as to allow the axial length of the

connecting device to be adjusted, locked locking nuts being screwed on to the threaded ends and pressed against the said armatures so as to fix said axial length of the connecting device after its adjustment.

15. A method of manufacturing a device for damped elastic connection according to Claim 1, the method comprising for manufacturing said at least one set of at least two viscoelastic sleeves, at least the steps consisting in :

- moulding the innermost sleeve of said set between, on the one hand, the innermost ring of said set or the internal armature and, on the other hand, an intermediate ring,
- shrinking said intermediate ring so as to preload the innermost sleeve in compression,
- moulding a contiguous sleeve around the said intermediate ring and between the latter and another ring which is radially on the outside,
- shrinking said other ring so as to preload said contiguous sleeve in compression, and so on until the outermost sleeve of said set is moulded and the outermost ring of said set is shrunk.

16. A method of manufacturing a device for damped elastic connection according to Claim 1, the method comprising, for manufacturing said at least one set of at least two viscoelastic sleeves, at least the steps consisting in :

- moulding all the viscoelastic sleeves at the same time, using a very-high-pressure moulding operation that limits the effect of the post-moulding shrinkage and precompressing the sleeves at the time of moulding,
- the innermost sleeve of said set being moulded directly on to said internal armature or on to the innermost ring of said set, and
- the outermost sleeve being moulded directly on to said external armature or on to the outermost ring of said set.